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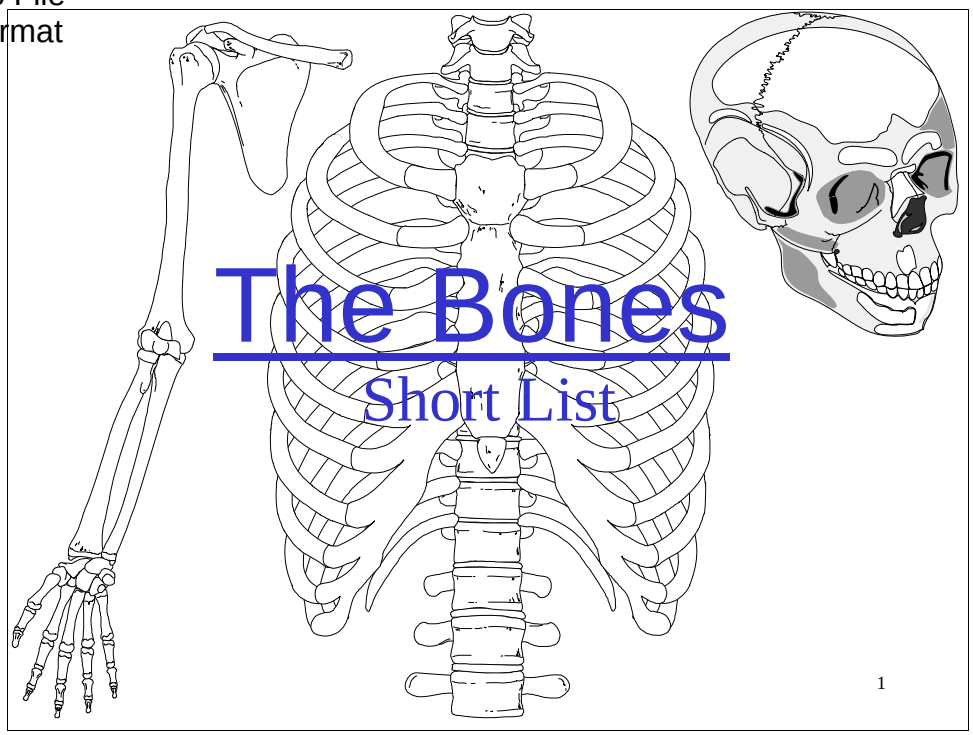

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Types of Bones

1) Long bones – bones of the upper and lower arms and legs as well as the metacarpals and metatarsals.
2) flat bones – sternum, ribs, scapulae, cranium
3) short bones – carpals and tarsals
4) irregular bones – vertebrae
5) sesamoid bones – patellae

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Skeletal Divisions

1) Axial skeleton – skull, sternum, ribs, and vertebrae (including sacrum)
2) Appendicular skeleton – bones of the pectoral and pelvic girdles and of the arms, legs, wrists, hands, ankles, and feet.

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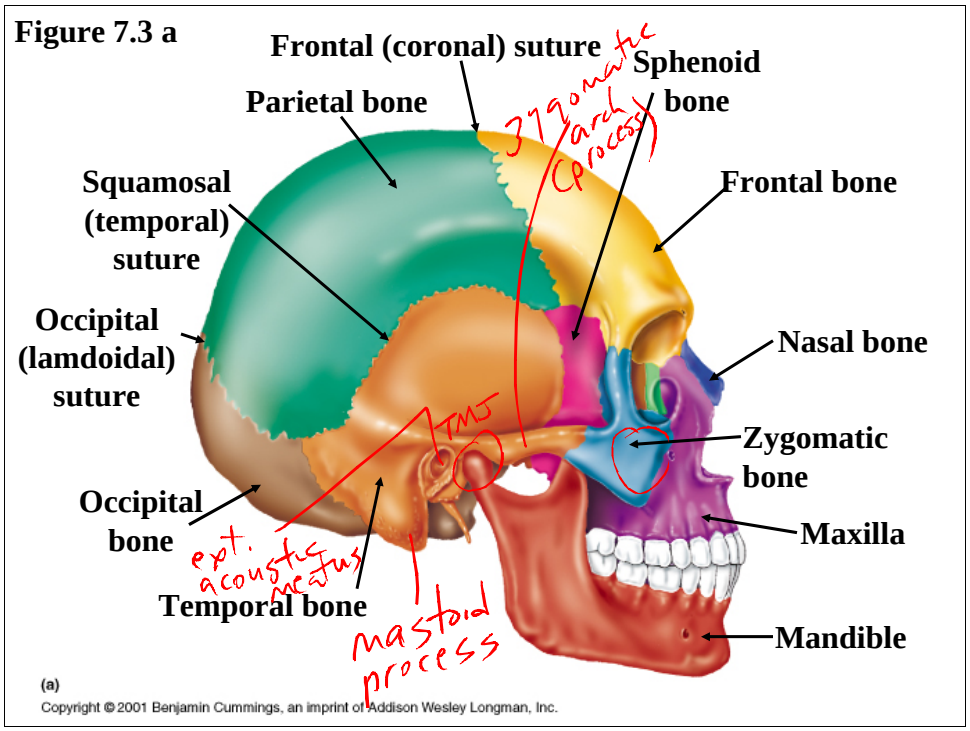
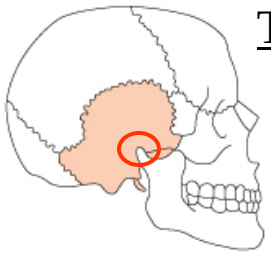
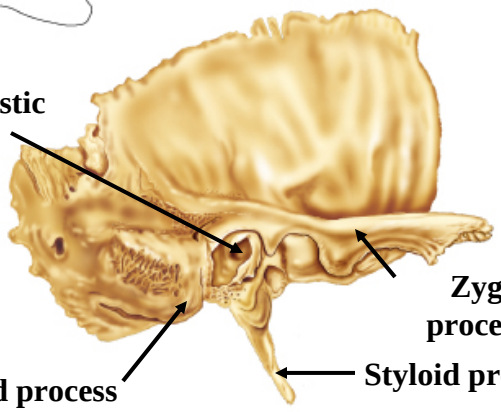


Important: the **mastoid process** (important site for attachment of muscles such as the sternocleidomastoid), the **external acoustic meatus** (opening into the parts of the ear), the articulation of the temporal bone and mandible (the **TMJ)**, and the **zygomatic arch**, all on the temporal bone.

Temporal Bone





External acoustic meatus

Zygomatic process (arch)

Styloid process

Mastoid process

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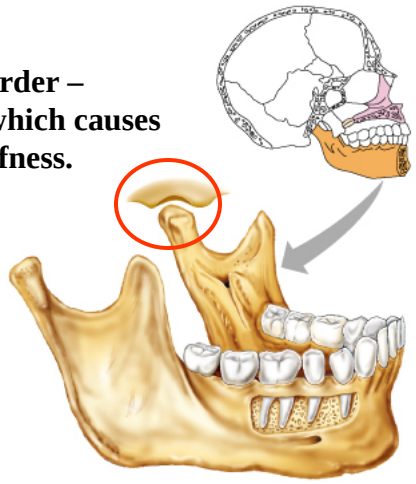
Tempero-mandibular Joint

TMJ disorder – inflammation which causes pain, stiffness.



(a) Mandible

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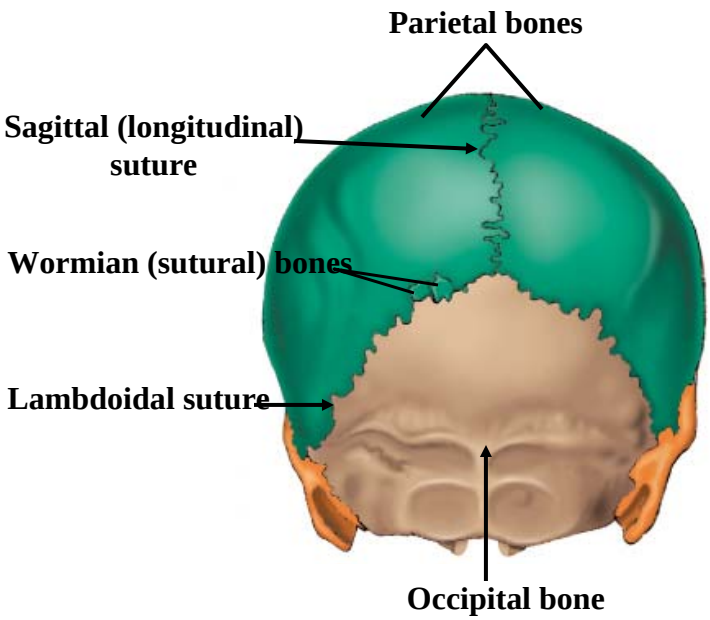
TMJ disorder usually occurs in young people and disappears as the bones mature. In older adults it results mostly from teeth grinding and clenching and can be corrected with behavior adaptation or oral appliances.


Parietal bones
Sagittal (longitudinal) suture
Wormian (sutural) bones
Lambdoidal suture
Occipital bone

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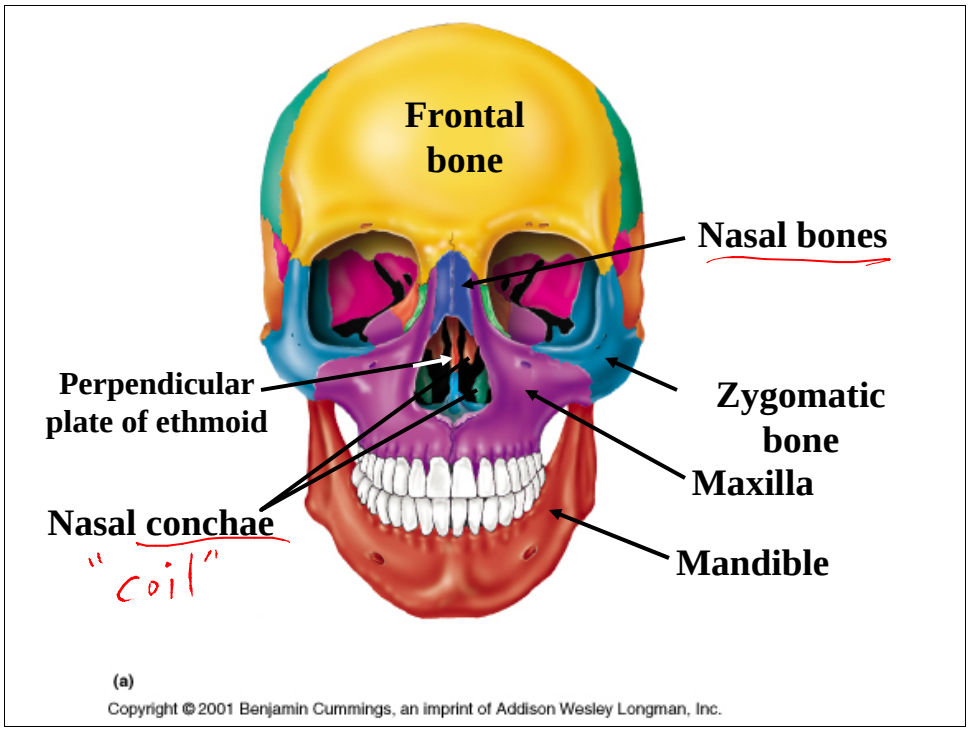
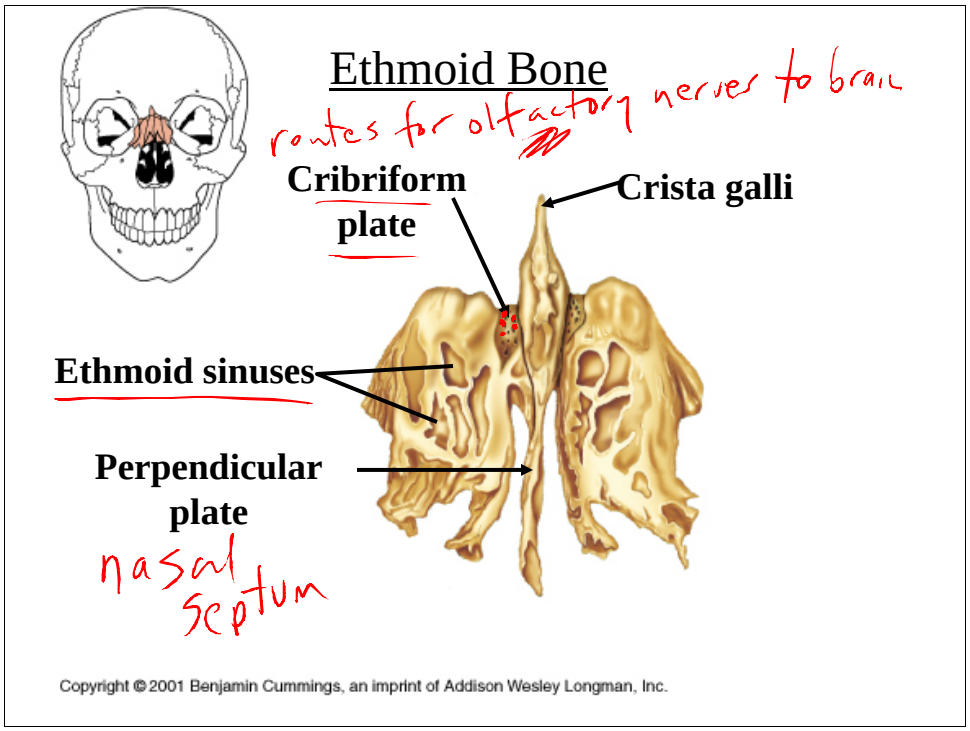
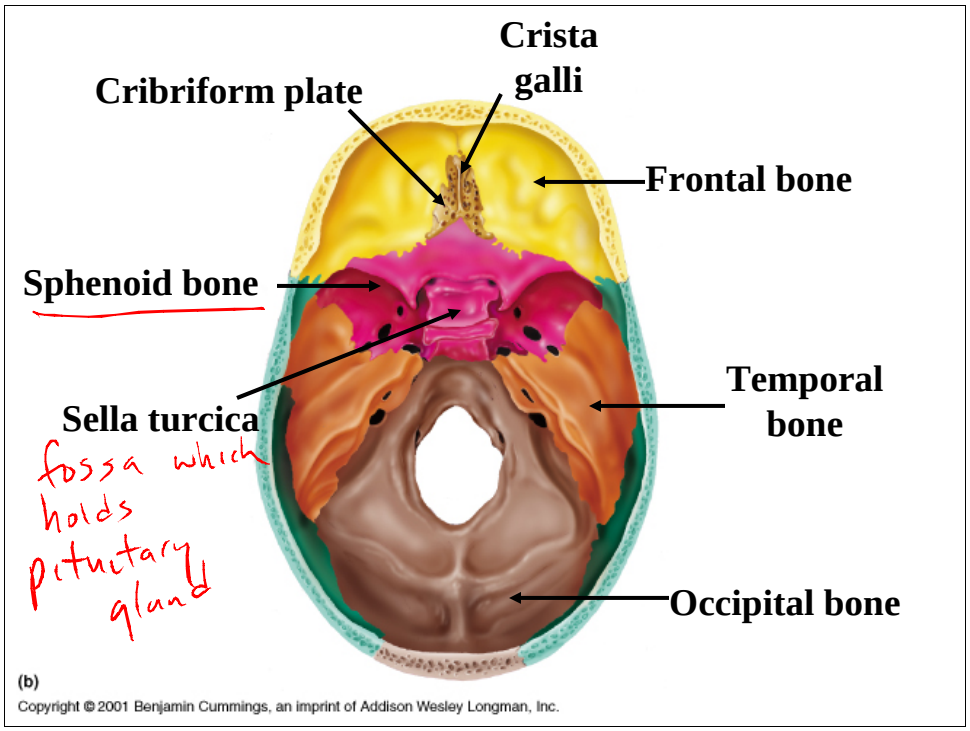


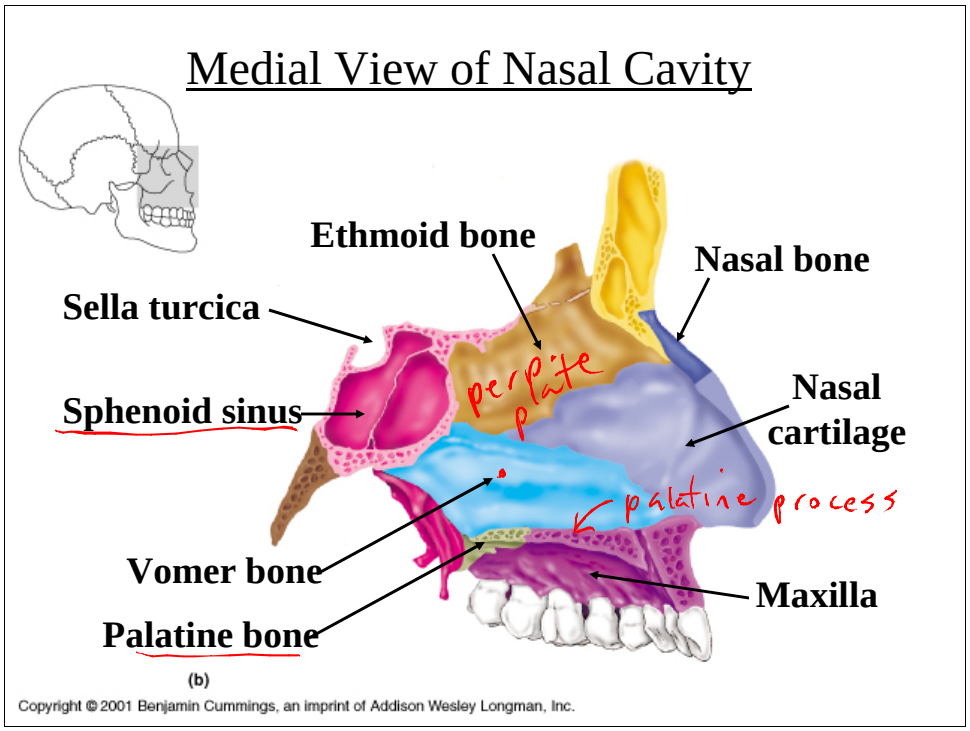
Note the nasal bones only make up a small portion of the bridge of the nose, most of the external nose is cartilage. And most of the nasal cavity is composed of parts of the **ethmoid bone**.



The **cribriform plate** allows the nerves for smell to pass from the olfactory receptors in the nasal mucosa to the olfactory bulb of the brain which lies directly above.

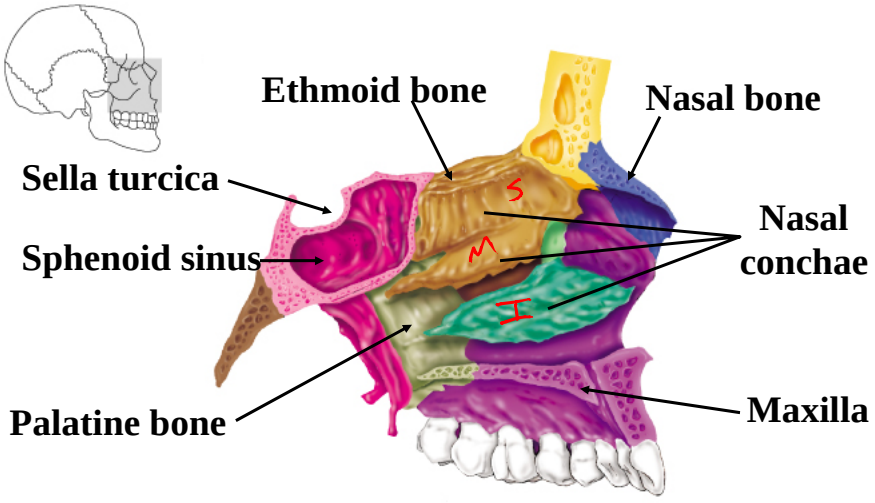


Note the upper part of the ethmoid bone in the floor of the cranial cavity. The **sella turcica** houses the pituitary gland.



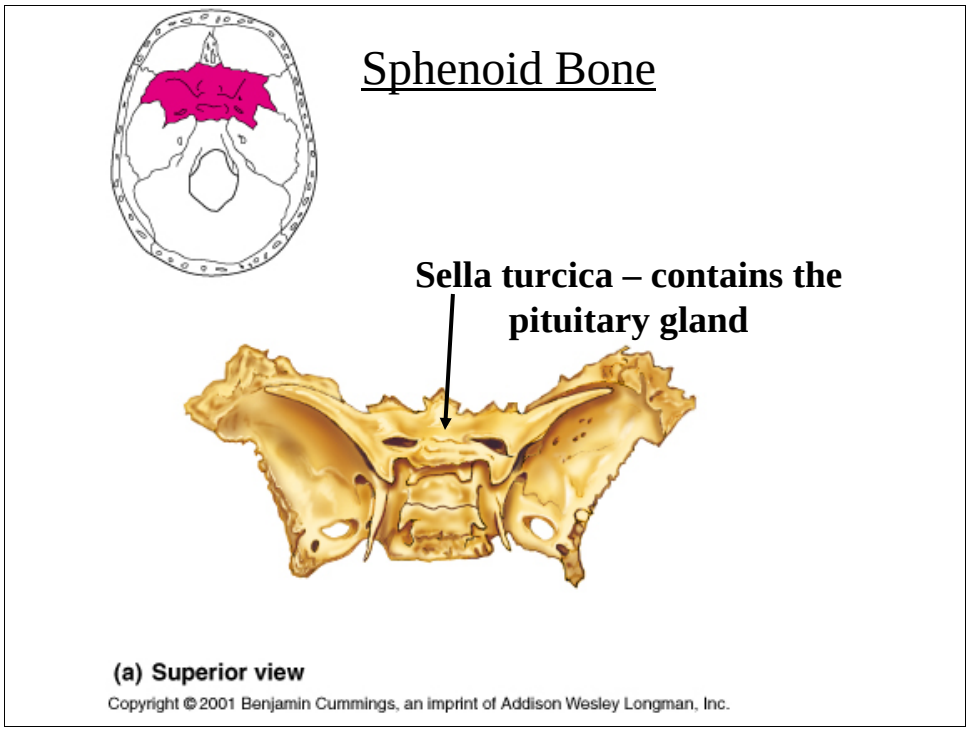
Bones seen here which contribute to the boundaries of the nasal cavity: **sphenoid bone**, **ethmoid bone**, **vomer bone**, **palatine bone**, **palatine process** of the **maxilla**.

Lateral Wall of Nasal Cavity



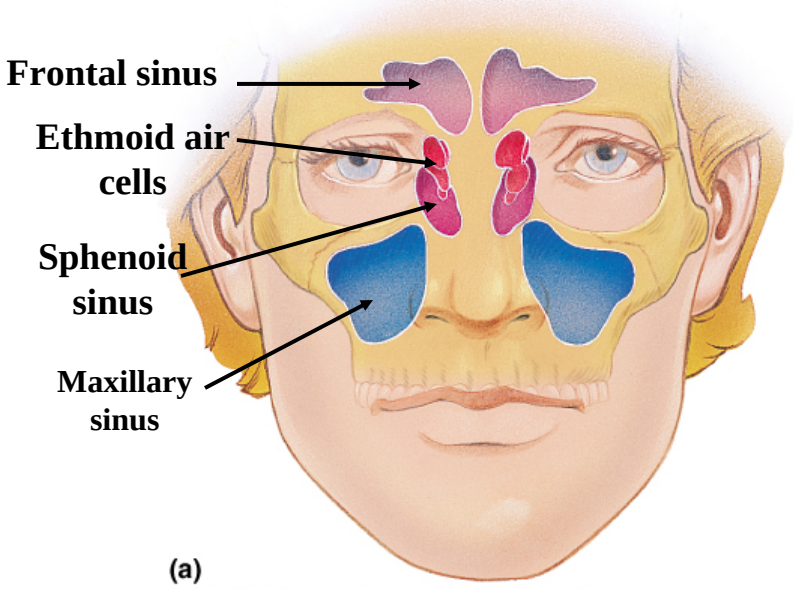
(a)

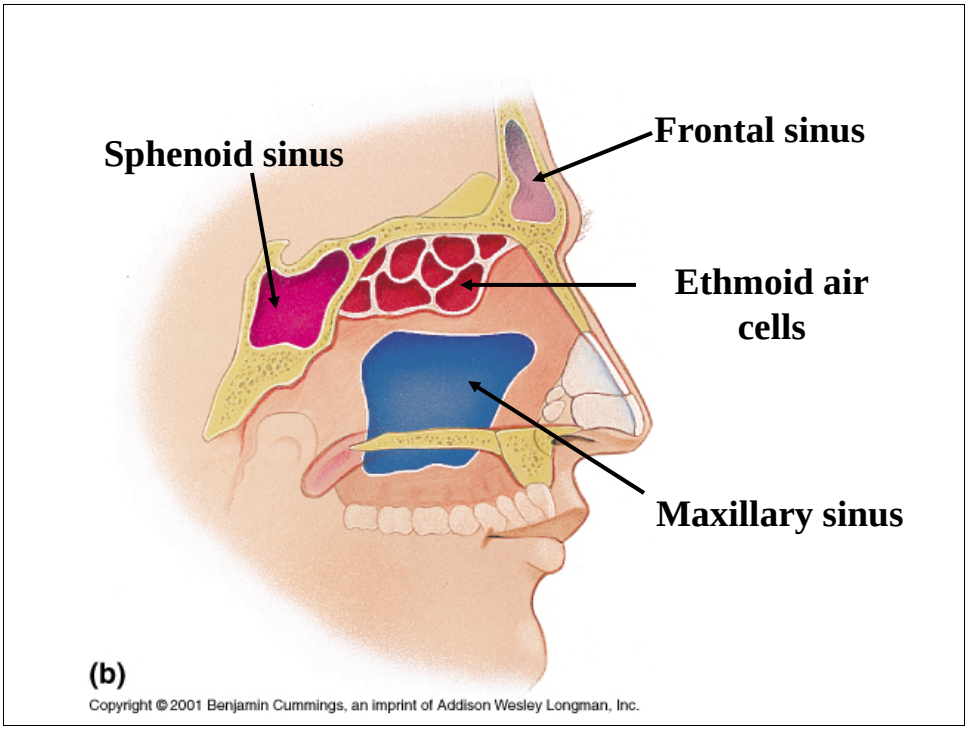
The nasal conchae increase the surface area for the air to pass across the mucosa and be warmed and moistened.



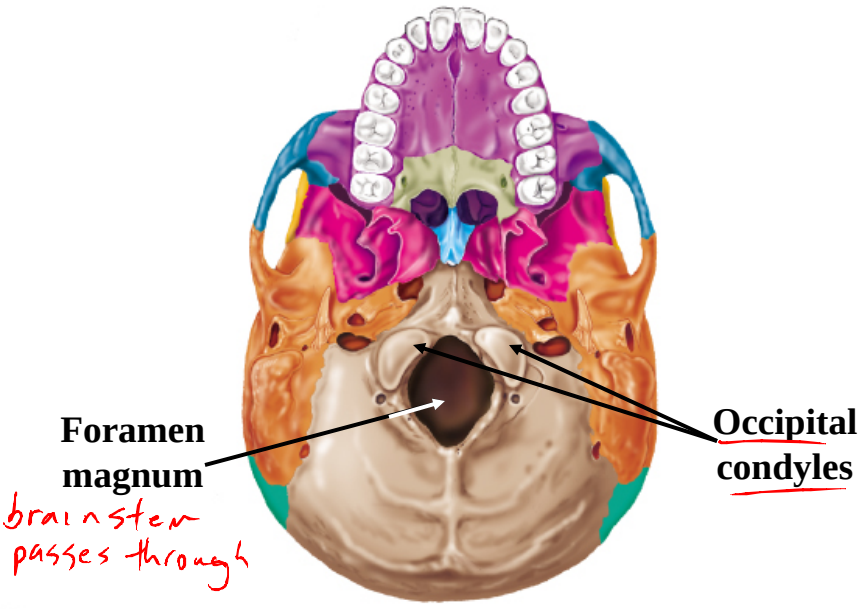
Sometimes called the “bat-shaped bone”

Paranasal Sinuses



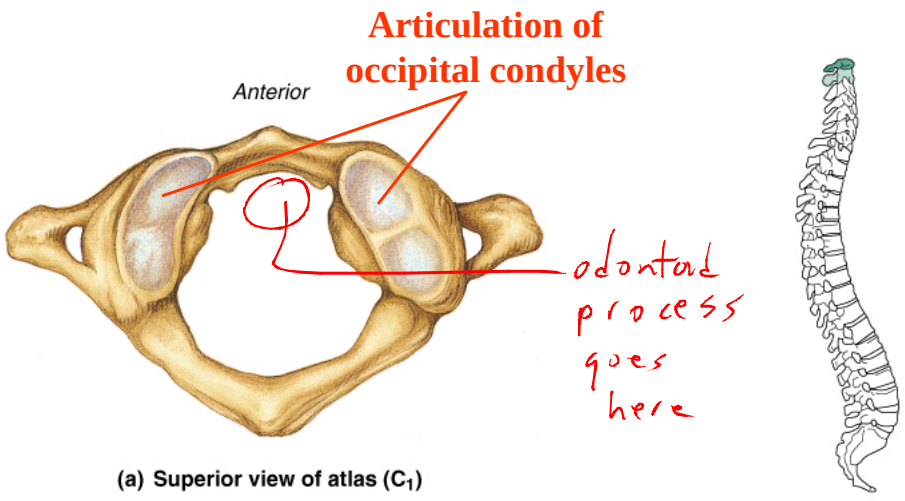


Sinuses must drain from one to another and into the nasal cavity to maintain open passages for equilibration of pressure. When the mucosa swells and pressure is unable to equilibrate sinus pain ensues.



(a)

The Atlas (C1)



(a) Superior view of atlas (C_1)

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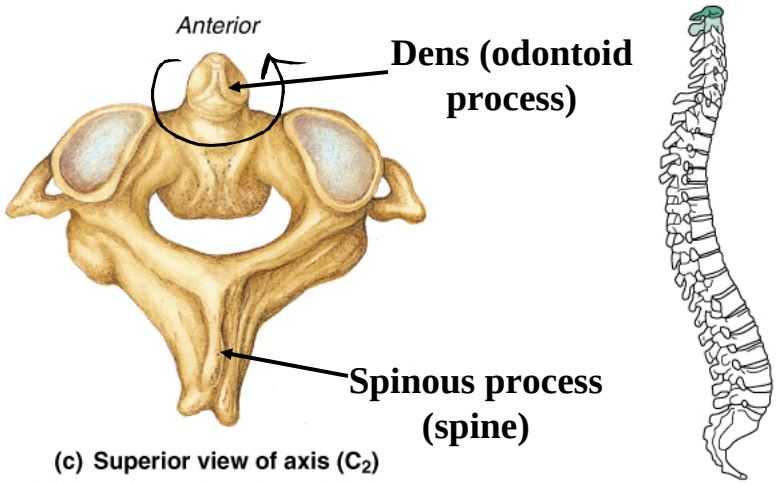
The occipital condyles sit atop the articular surfaces of the atlas producing a **condylar joint** which allows flexion and extension of the head.

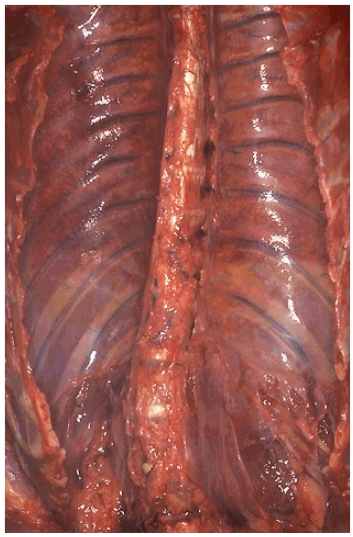
The Axis (C2)

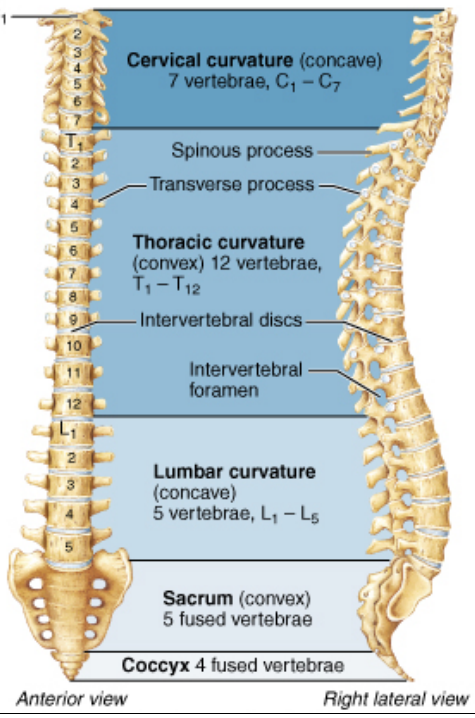


(c) Superior view of axis (C_2)

18

The atlas and head rotates around the **odontoid process** of the axis.





Cervical vertebrae = C1-C7

Thoracic = T1-T12

Lumbar = L1-L5.

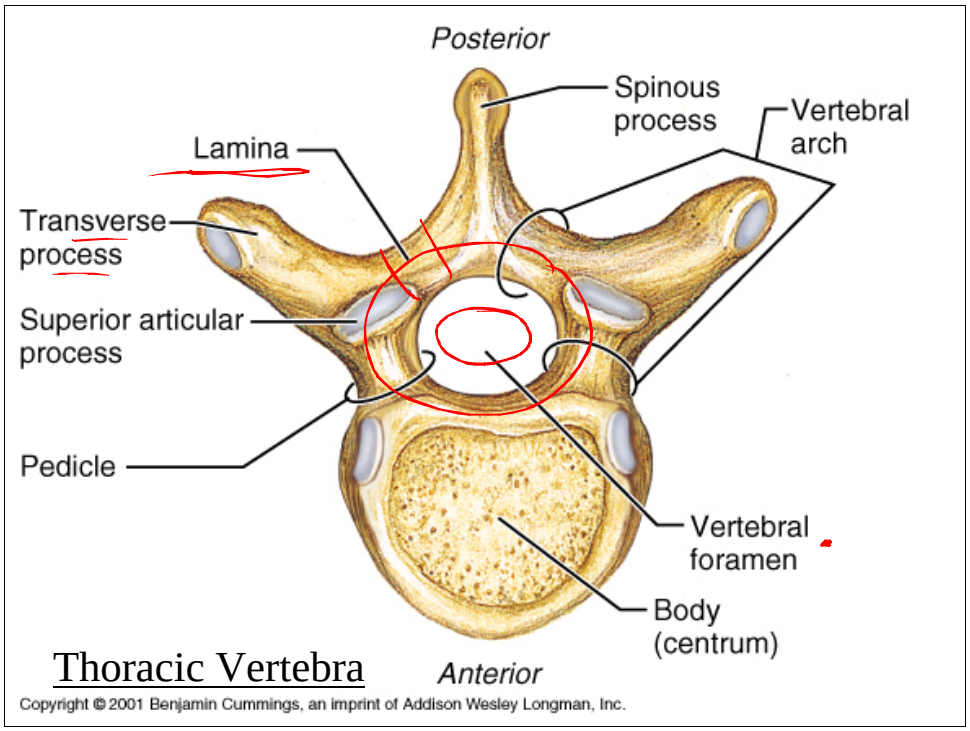
Sacrum = 5 fused

Coccyx = 3 to 5 fused

Exaggerated thoracic curvature = kyphosis

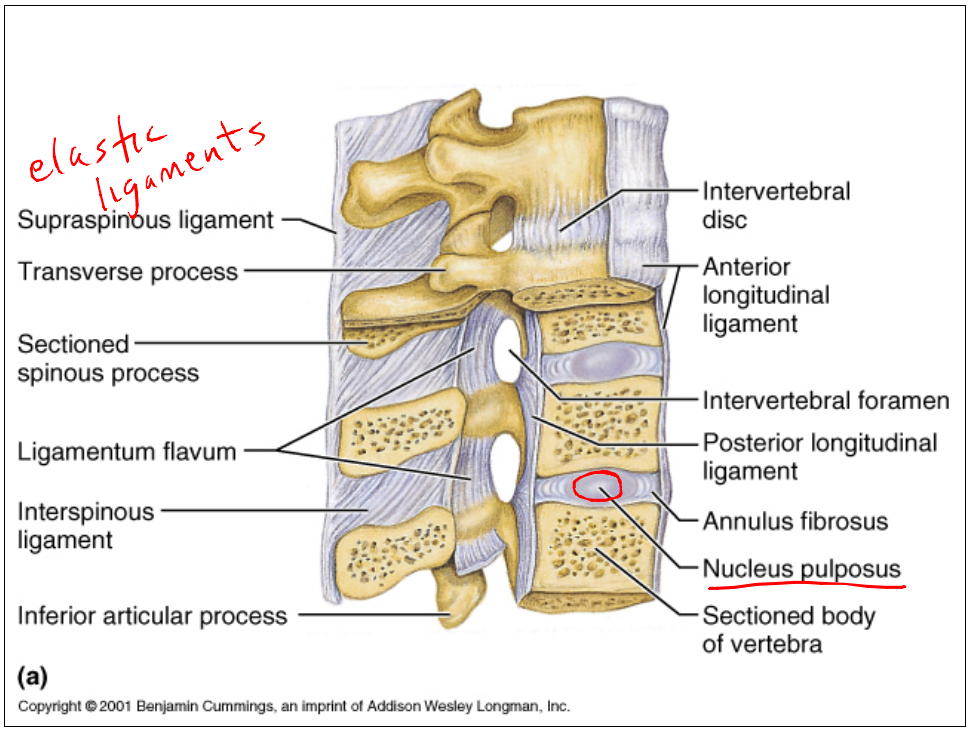
Exaggerated lumbar curvature = lordosis

Exaggerated lateral curvature = scoliosis

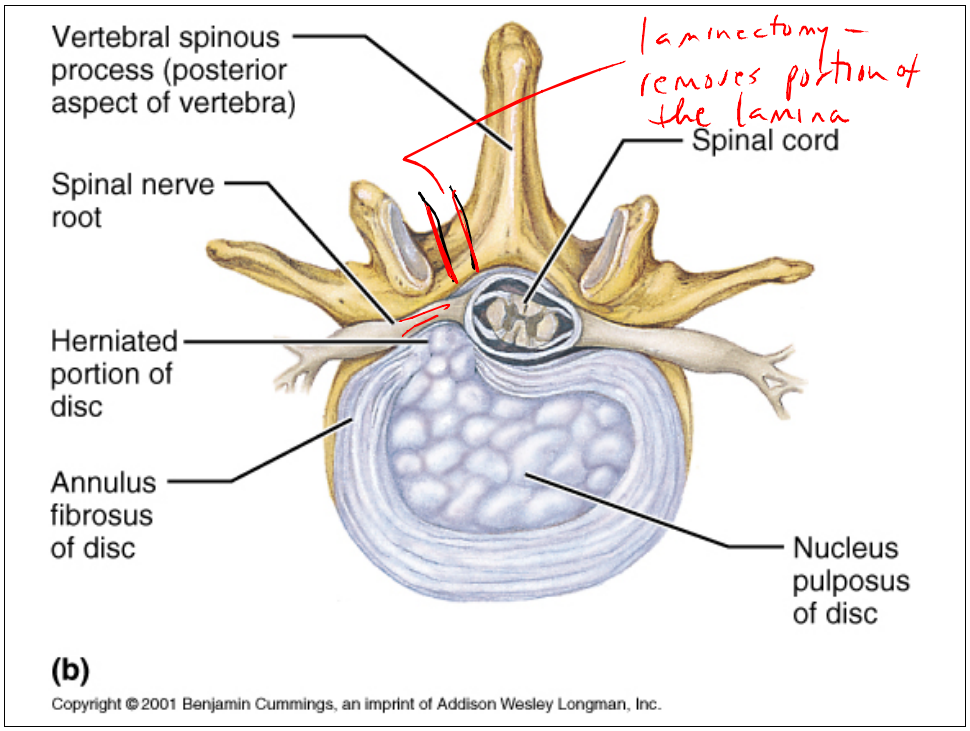


Thoracic Vertebra

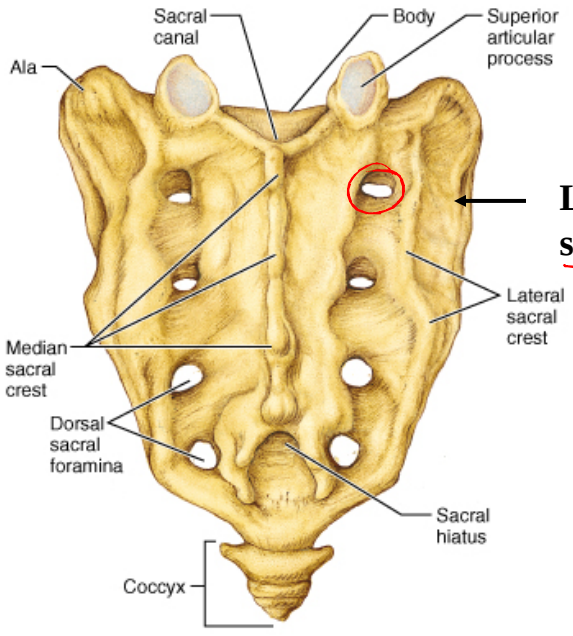
Parts to know: body, vertebral foramen, vertebral arch, lamina (part of the arch), transverse process, spinous process (spine).



Many of the vertebral ligaments are elastic to provide flexibility. The intervertebral disks are fibrocartilage, but with variations between the **nucleus pulposus** in the center and the **annulus fibrosus** around the outer edge.



The **nucleus pulposus** (pulpy center) acts to absorb shock, while the **annulus fibrosus** (fibrous ring) holds the disk in place. Uneven pressure placed on the disk from improper lifting, etc. can cause the nucleus to rupture through the fibrous ring, called a **herniated disk**. This can put pressure on the nearby nerve roots, causing pain. Removal of a portion of the **lamina** (**laminectomy**) is sometimes done to relieve pressure on the spinal nerves when a disk herniates.



The Sacrum (dorsal view)

Figure 7.18

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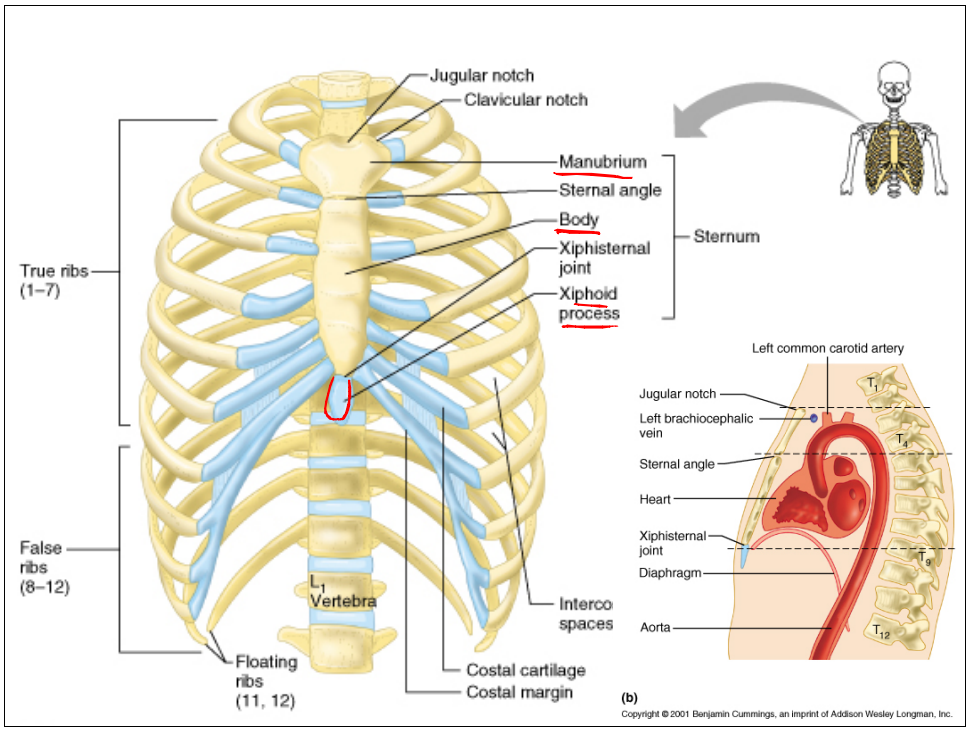
Nerve roots pass through the foramina between the processes of the 5 vertebrae which have fused to produce the sacrum.



Note the three bones of the sternum: the **manubrium**, the **body** (or **gladiolus**), and the **xiphoid** process. The xiphoid process usually remains cartilaginous. Ten of the twelve pair of ribs attach to cartilages, the **costal cartilages**, which attach to the sternum.

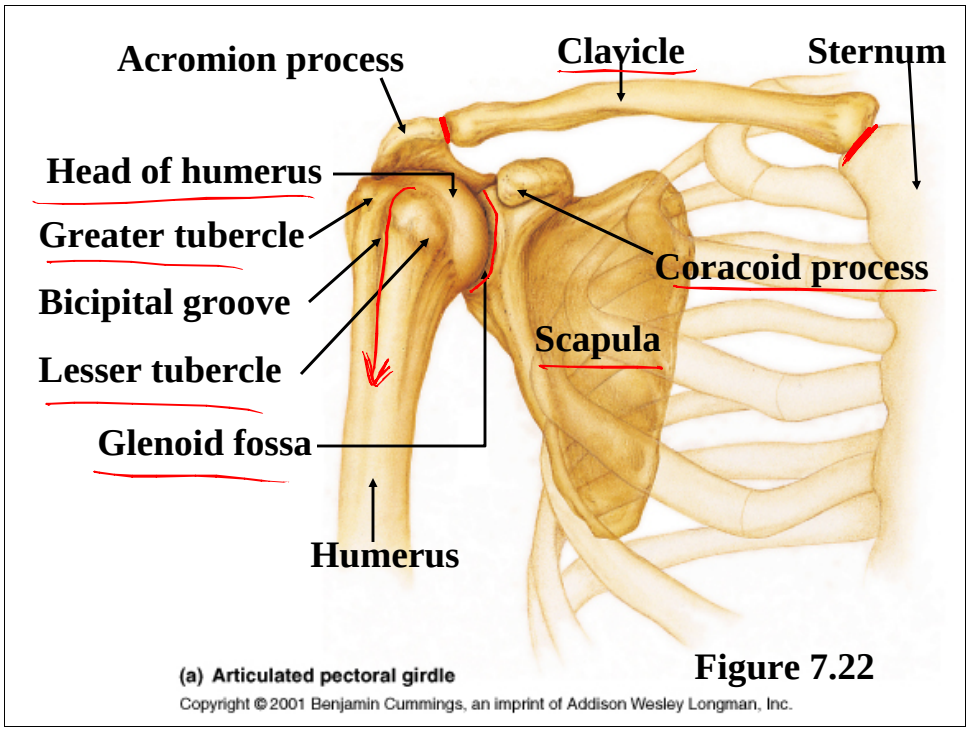
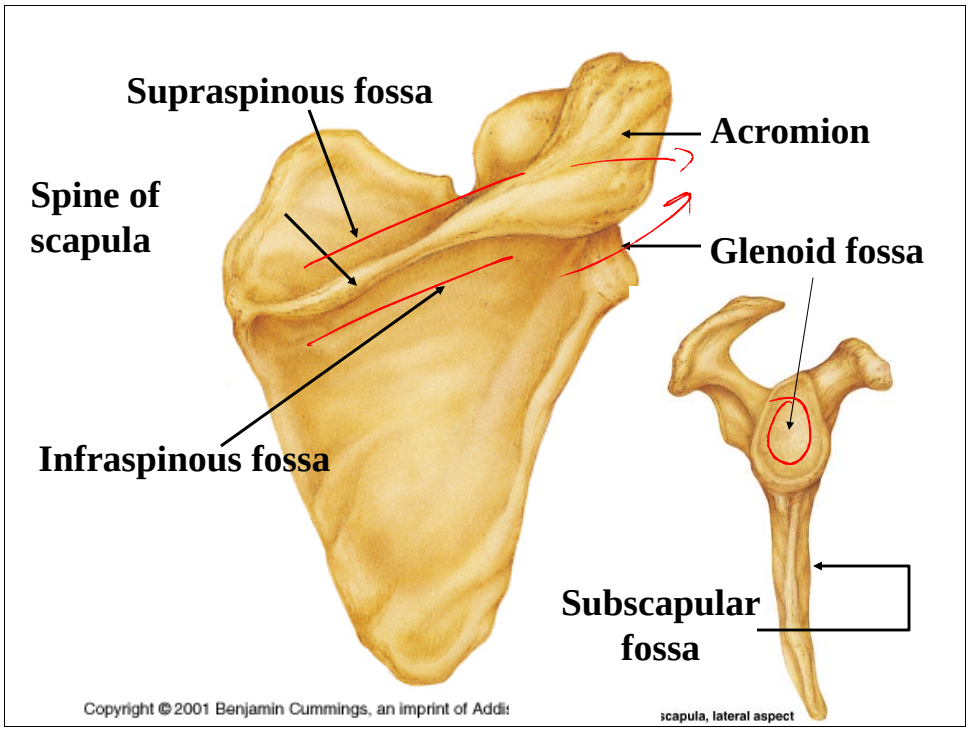
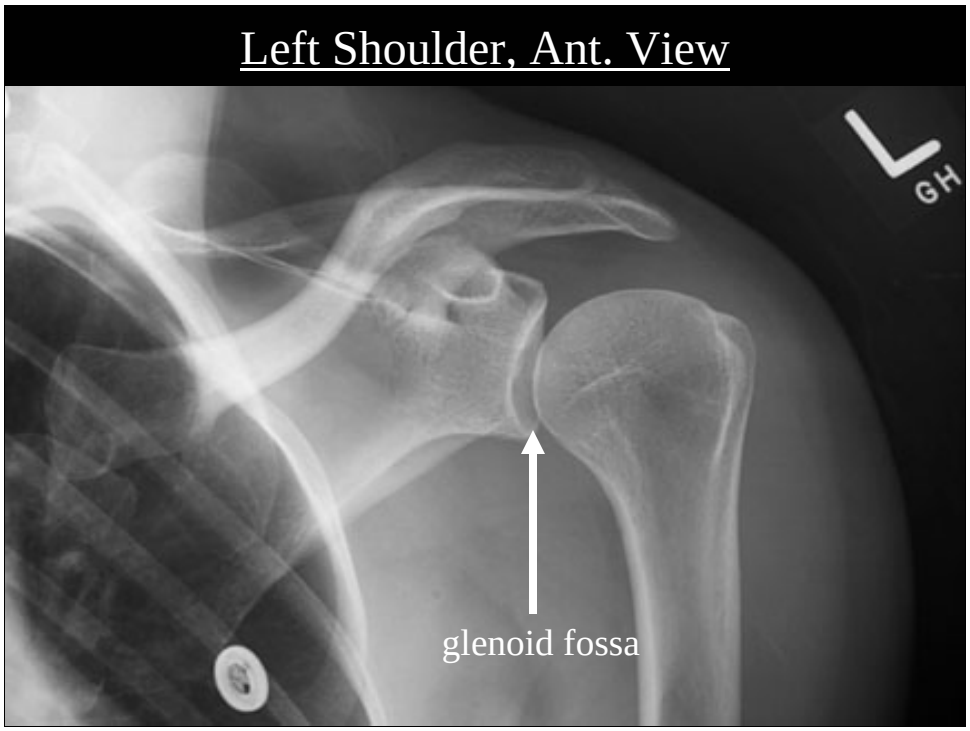


Figure 7.22

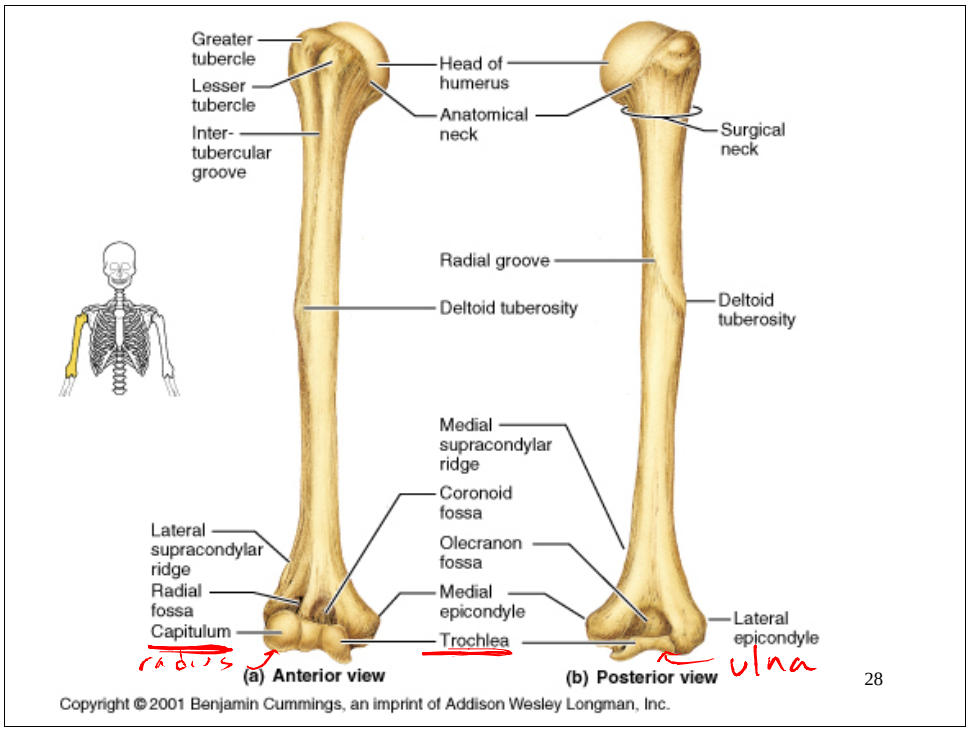
The shoulder is movable due to flexible fibrous joints between the scapula and clavicle and bony support is minimal. Because of this a muscle group called the rotator cuff as well as other muscles are the main support for the shoulder.



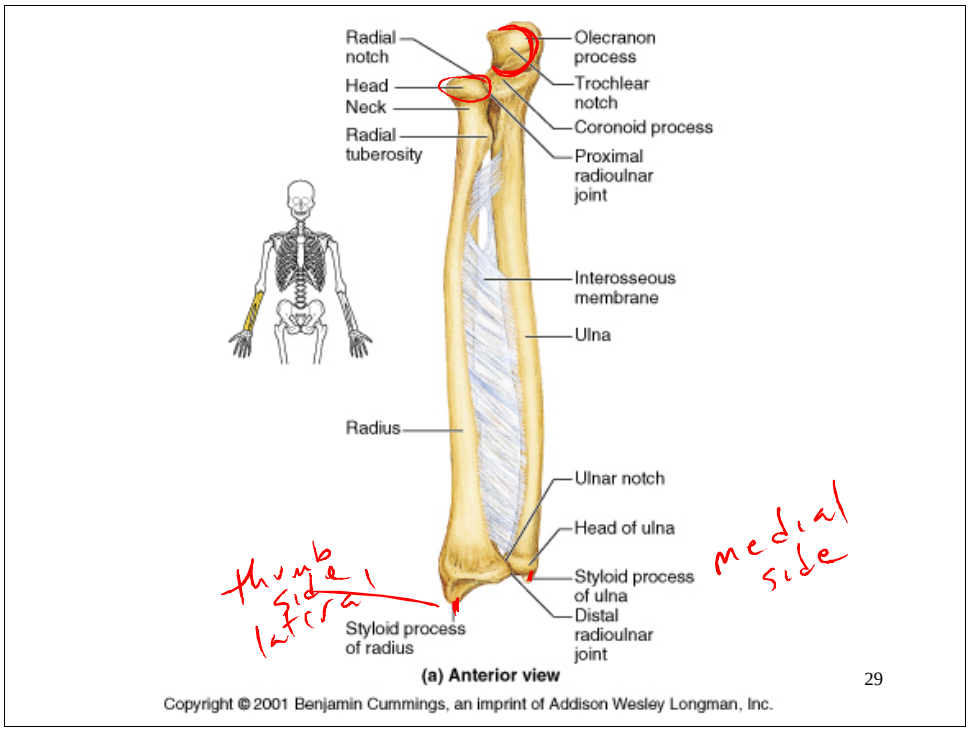
Muscles pass through the fossas above and below the scapular spine, as well as the fossa on its anterior surface. These muscles are part of the **rotator cuff**.



Notice the shallowness of the **glenoid fossa**. For this reason it requires muscular support in the form of the **rotator cuff**. Also note the dark "space" in the radiograph where the soft tissues are located.

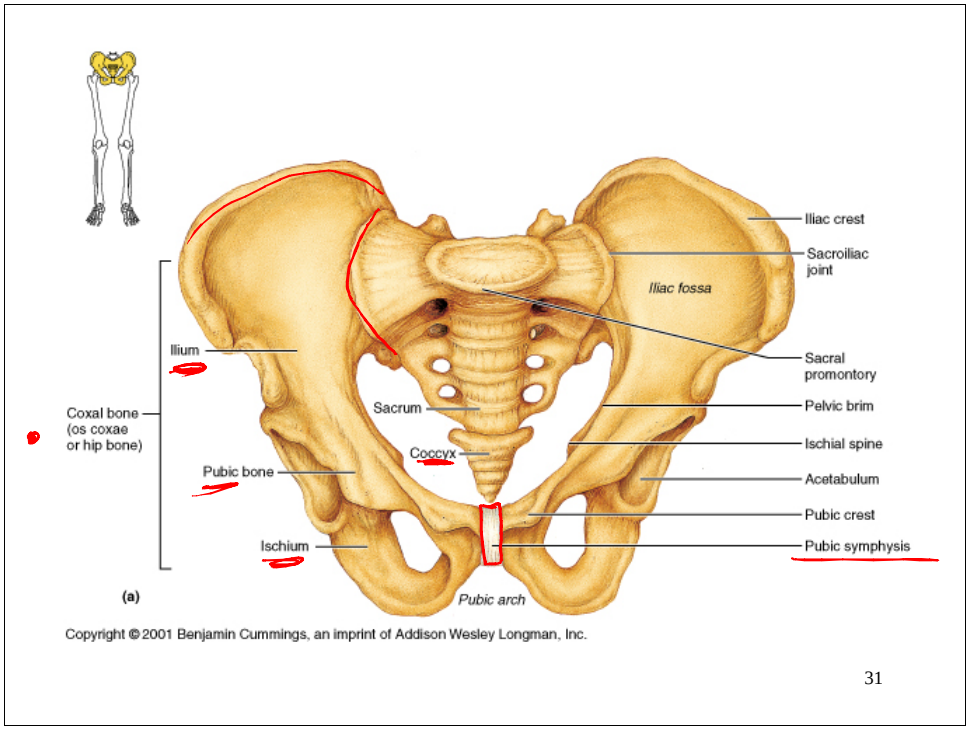


The distal end of the humerus has two important processes: the **capitulum** which articulates with the **head of the radius**, and the **trochlea** which articulates with the **trochlear notch** of the ulna.

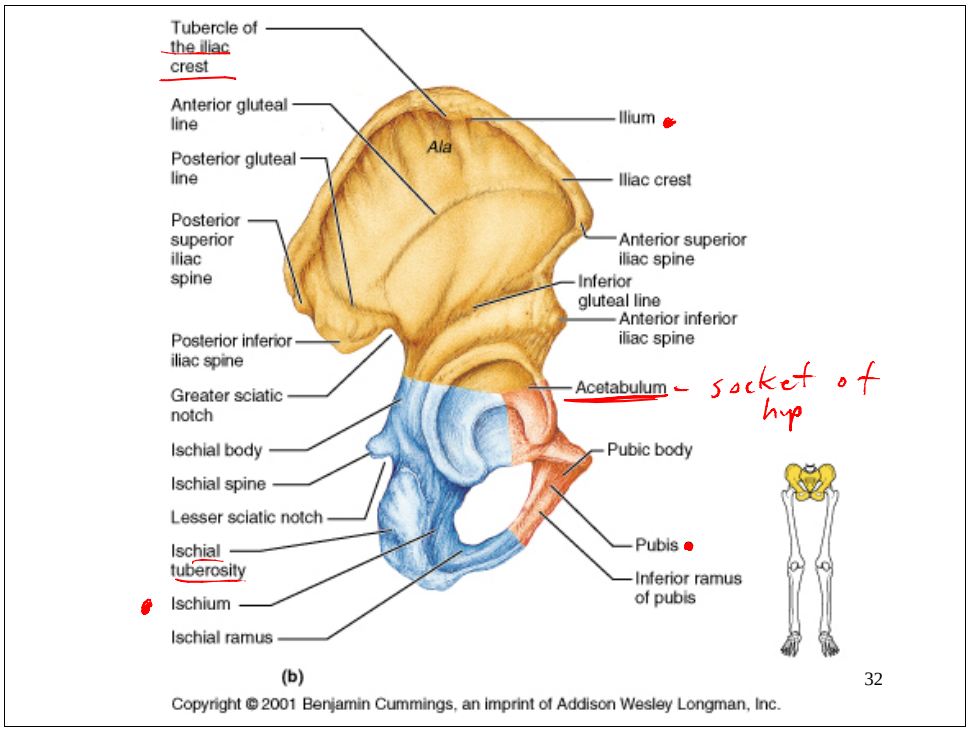


The joint formed by articulation of the radius with the capitulum is a **pivot joint** which allows rotation of the radius to produce **supination** and **pronation** of the hand. The joint between the trochlea and trochlear notch is a hinge joint which permits **flexion** and **extension** of the elbow.

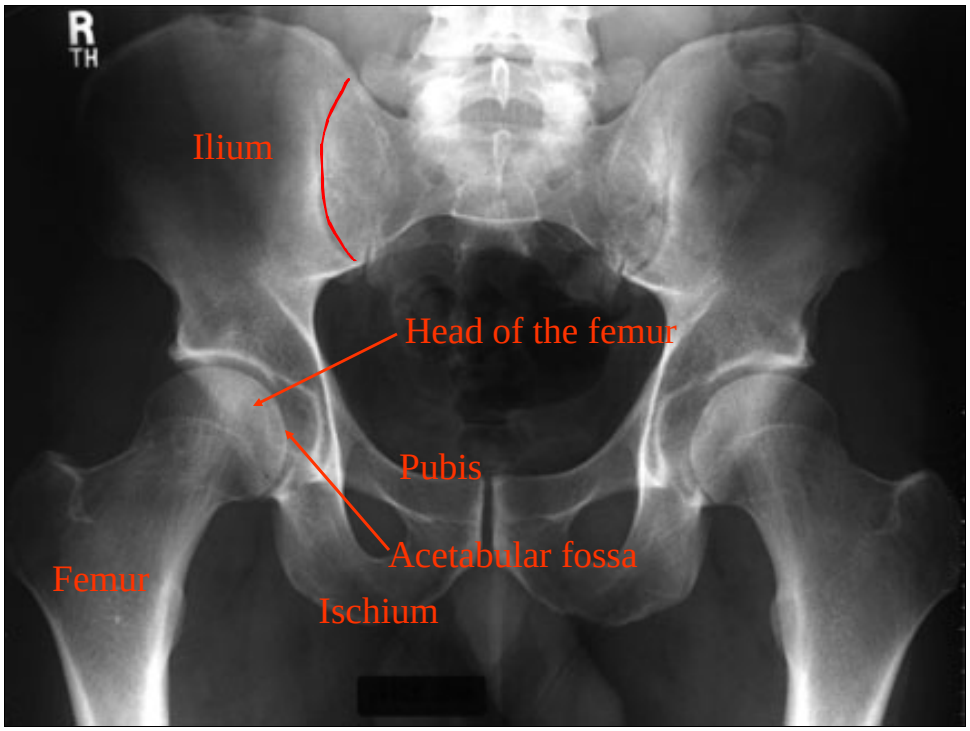
Note the nomenclature of the **metacarpals** and **phalanges**.



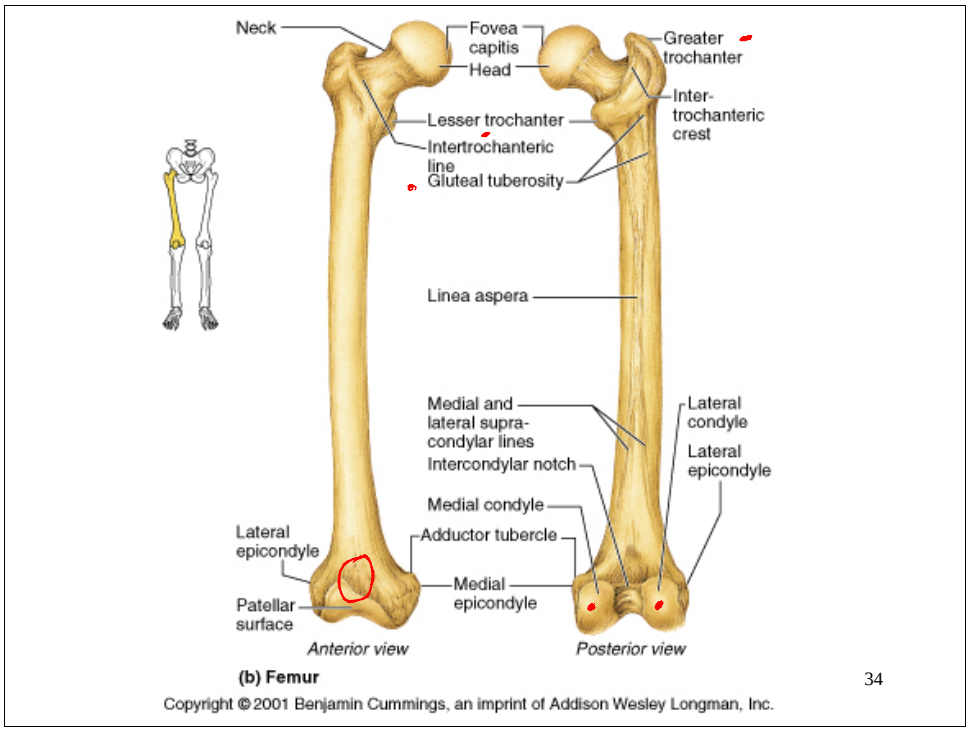
The pelvic bone is properly terms the **os coxae** or **coxal bone** (don't confuse it with the coccyx) and is comprised of three separate bones.



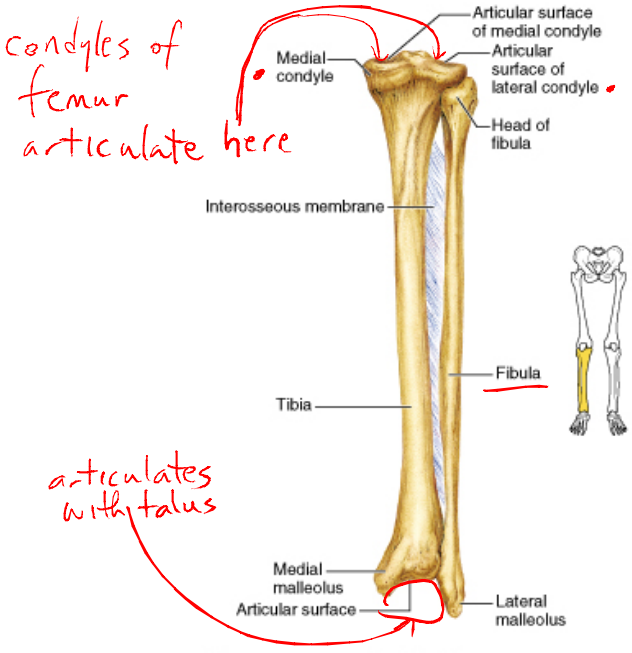
The three coxal bones unite at the **acetabulum** (**acetabular fossa**) which is the socket for the hip.



The hip has much more structural support through the deep socket of the acetabulum.



The distal end of the femur has the **condyles**, which articulate with the condyles of the tibia at the knee joint. Note the patellar surface of the tibia which articulates with the patella.



(a) Superior view

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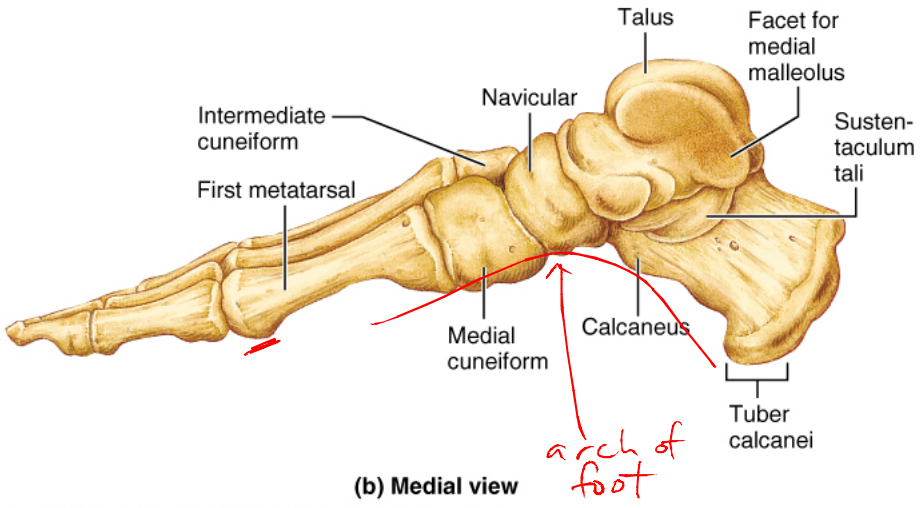

(b) Medial view

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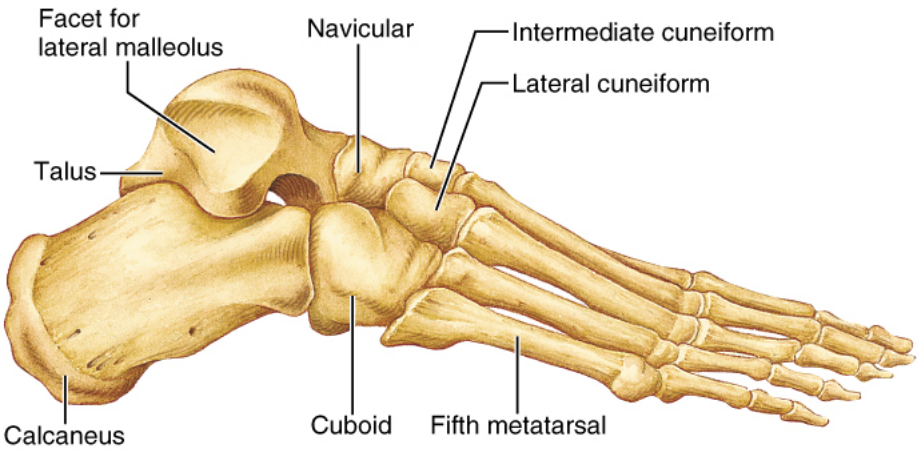

(c) Lateral view

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